AGRICULTURAL RECOMMENDATIONS FOR THE STIKINE RIVER VALLEY

Graeme Johnstone and Brigitte Leffler
B.C. Ministry of Agriculture, Fisheries and Food
Smithers, B.C. V0J 2N0

George Emmond and Jim Tingle
B.C. Ministry of Agriculture, Fisheries and Food
Prince George, B.C. V2N 4M6

MAY 1992

Province of British Columbia
Ministry of Agriculture, Fisheries and Food

93-00909/

Cover: Vegetables grown on the Mark Steven's farm near Glenora.

Canadian Cataloguing in Publication Data

Main entry under title:
Agricultural Recommendations for the Stikine River Valley

Included bibliographical references: p. 24
ISBN 0-7718-9200-4

1. Agriculture - Stikine River Valley (B.C. and Alaska)
2. Agriculture - British Columbia, Northern. I. Johnstone, Graeme II. British Columbia. Ministry of Agriculture, Fisheries and Food

SB87.C32B74 1992 630' .9711' 85 C92-092191-4

INDEX

PAGE

Introduction 1

Soil Tests 1

Enterprise Selection 2

Crop Evaluation 2

Irrigation 2

Horticulture 2
- Insect Control 2
- Weed Control 3
- Soil Preparation 3
- Soil Amendments 4
- Fertilizer Use 4
- Perennial Crops 4
  - Currants, Gooseberries, Raspberries 4
  - Strawberries 4
  - Vegetable Crops 4
- Transplants 5
- Frost Protection 6

Greenhouse Crops 8

Flower Seed Production 9

Berry Crops 9

Marketing 9

Storage 9

Trees and Shrubs 10
- Fruit Tree Growing 10

Recommended Varieties
- Vegetables 12
- Small Fruit 14
- Miscellaneous Fruit 14
- Trees and Shrubs 15
- Landscaping Materials 15

Plant and Seed Sources 17

Field Crops 19

Summary 23

References 24

INTRODUCTION

The Stikine Valley, located in Northwest British Columbia (National Topographic Series Map 104G), lies along both sides of the 58 degrees N latitude. The best potential for agricultural and horticultural crops lie between the Chutine River in the south and the Day Ranch in the east.

Climatic capability for agriculture ranges from Class 2 to 5 in the potential growing areas. Climate information is based on records from a weather station at Telegraph Creek over a long period. Shorter term data is available from the Glenora station located thirteen miles southwest of Telegraph Creek. A variation from 76 to 123 frost free days with an average of 101 days is typical and is site specific due to the flat bench soil formations backed by steeply rising hills and mountains on the north side of the valleys. Longer frost free periods occur than at other similar latitudes in northwest B.C. The killing frost period is longer and is established at 153 days average.

Soils in the Stikine Valley were inventoried for soil agricultural capability in 1977. The soils are described in the report "Telegraph Creek Area - Soil and Agriculture Capability," by P. Epp and M. Fenger, 1978. The amount of land mass in each soil capability which have a potential for agriculture are as follows:

Area and Percentage of the Inventory Area Occupied by Each Soil Capability for Agriculture Class

Capability Class	Non-irrigated Rating		Irrigated Rating	
	Area (ha)	% of Total	Area (ha)	% of Total
2	—	—	1,150	4.3
3	870	3.2	1,130	4.2
4	3,170	11.7	2,210	8.2
5	6,620	24.6	6,170	22.8
6	13,500	50.0	13,500	50.0
7	2,840	10.5	2,840	10.5

Approximately 10,600 ha of classes 2 to 5 soils could be developed for agriculture and most of the soil has irrigation potential. The nature of the benchlands frequently leaves small flat areas of 10 to 50 ha isolated from the next suitable area. Consequently, there is virtually no opportunity for large extensive farm units to be developed except in an area north of Telegraph Creek.

The soils are generally sandy loams in texture and subject to drought, making irrigation a requirement to ensure good crops. Most of the presently cultivated areas have creeks running through or near them making gravity irrigation very feasible. However, as with all irrigation systems, very careful control is required to avoid excessive growth and unmarketable quality produce. It cannot be over-emphasized that each parcel of land has its own micro-climate which may or may not be similar to an adjacent parcel and requires different management practice.

SOIL TESTS

Soil tests generally have shown that nitrogen (N), potassium (K), sulfur (S), boron (B) and organic matter are deficient. The pH ranges between 6.0 and 7.5. Other trace element deficiencies have not yet been established but should be watched for, particularly in horticultural crops. The use of organic materials to build up the organic content of the soil is particularly important. Any kind of animal manure and crop residues are very suitable as soil amendments. Cereal and legume crops, grown singly or in combination and plowed under also improve organic content and moisture holding capacity of the soil. Organic farming will not correct recognized soil mineral deficiencies, especially if crop produce is sold off the farm. The use of complete fertilizers has given marked yield increases and will assist legume survival. Boron application is critical for legume survival and to prevent hollow heart of rutabagas.

ENTERPRISE SELECTION

The isolation of the Stikine Valley from markets dictates that careful consideration be given to farm enterprise selection. Apart from the community of Telegraph Creek, the nearest population centre is Dease Lake, 75 miles to the east. Other centres further away are Wrangell and Watson Lake. The most likely enterprise to find a market is vegetables and some berries and fruits. Small animals such as rabbits and chickens are a possibility with goats being suitable for home use but not for unpasturized milk sales. The Milk Industry Act forbids the sale or distribution of unpasteurized milk. There is very little Crown rangeland except east of Telegraph Creek, thus cattle farming is not recommended. The low number of beef cattle in the area makes keeping a bull quite expensive. Artifical insemination is possible but training and service is difficult because of location.

Hay sales to the guide-outfitters along highway #37 are also profitable.

CROP EVALUATION

Several varieties and selections of forage, cereal and horticultural crops were distributed to cooperators at several sites from 1980 to 1983 to evaluate their growth under local conditions. The testing was organized by the B.C. Ministry of Agriculture, Fisheries & Food (B.C.M.A.F.F.) under D.A.T.E. Project #81.

Sufficient results have been obtained to provide a basis for recommendations and these will be amended as further information becomes available. In most years grain and forage varieties were successfully harvested, and in 1984 forage mixes were seeded for hay and pasture. Many horticultural crops were also grown successfully. Vegetables and small fruits grow especially well in the Stikine River Valley. A limited number of hardy fruit trees appear to be suitable for the area.

IRRIGATION

Annual precipitation in the Stikine Region ranges from 320-500 mm (14 to 25 inches). However, summer droughts are frequent, making irrigation necessary. Proper irrigation would ensure good seed germination, adequate plant development, early crop maturity and good quality yields during the dry periods. Sprinkler irrigation with not too cold water – ranging from 60° - 70° F, or 15° - 21° C – is much preferred. Water applied should be sufficient to bring the soil moisture up to field capacity (F.C.) and not allow it to go below 70% F.C. during the growing season. Frequent light irrigations, except on newly seeded or emerging small seed crops, should be avoided.

Assistance with planning and installation of an irrigation system on a commercial enterprise is available through the B.C.M.A.F.F., Agricultural Land Development program.

HORTICULTURE

Crops adapted to cool-season growing such as beets, broccoli, cauliflower, carrots, lettuce, peas, potatoes and rutabagas grow exceptionally well in the Stikine River Valley. Hardy strawberries and raspberries also grow well. Heat-loving crops, such as cucumbers, onions, sweet corn, squash and tomatoes are not consistently successful, but they will produce a crop in years when above-normal temperatures prevail or under special crop management procedures. Greenhouse crops such as cucumbers, peppers, tomatoes and bedding plant production are well adapted to the area.

Insect Control

The presence of soil pests such as wireworms, cutworms and white grubs should be determined prior to soil preparation for a vegetable growing area.

The soil should be carefully examined for these insects and appropriate control procedures taken, otherwise vegetable or berry crop production could be severely hampered. In addition, special attention will

have to be given to the control of such pests as aphids, root weevils, cabbage worms, flea beetles, mites, turnip beetles and slugs on vegetable, berry and fruit crops during the growing season. Control procedures for all common pests and diseases are available from the B.C.M.A.F. offices.

Weed Control

To minimize weed problems, control all perennial weeds prior to the planting year by removing and burning all weeds including those from the surrounding border area and spraying the future growing area with a herbicide such as Roundup. After waiting 7-10 days for the herbicide to translocate to the roots plow the dying weeds under and continue to lightly cultivate to encourage the germination and growth of annual weeds. It is advisable to pull, bag and burn all weeds that have gone to seed, preferably on a damp day, to help reduce seed scattering.

In the spring of the planting year prepare the seed bed early and delay seeding until weed seeds have germinated and fully emerged. The emerged weeds can be killed by cultivation or spraying and the vegetables sown. A better method would be to sow the vegetable seeds through the weeds, wait and spray the weeds three days before the vegetable crop emerges. This is referred to as the stale-seedbed method of weed control.

Figure 1
Tunnels in rows on the Mark Steven's farm at Glenora

Soil Preparation

In preparation of a new garden area, site selection is all important. Silty loam to loam textured soils with a high organic matter content (up to 10%) and good water and air drainage are ideal for vegetable growing. Full exposure to the sun is needed for good plant growth.

On older gardens, fall plowing to incorporate crop residues, compost or manure materials spread over the surface is essential for most but not all vegetables grown the next year. Fall plowing also reduces insect and disease problems, allows the buried materials to start decomposing, helps the action of frost to break down soil lumps and keeps the soil surface free of trash for the spring seeding operations. Spring tillage should be shallowto produce an ideal seed bed for small vegetable seeds, to firm the surface soil slightly, and to keep any remaining un-decomposed residues buried.

Soil Amendments

Manure or compost enhances soil productivity and moisture retention by increasing the organic matter content and supplying some essential nutrients. These materials should be incorporated immediately after spreading. Fall applications of plant refuse, compost or barnyard manure at 500 kg/100 m² (1/2 ton or 12 bushels/1,000 sq ft) should be used whenever it is available. Poultry manure can be used but only at "one-half" the rate of barnyard manure. Fresh manure should always be applied late summer or early fall and incorporated. When applied to growing horticultural crops, it must be previously composted to prevent root damage.

Garden refuse, straw, hay and including fresh or old manure can be layered and composted in open piles or enclosed by wire, etc. To encourage rapid decomposition and improve the nutrient level of the compost a complete low analysis fertilizer, such as 12-4-8 at one cup per bushel of lightly packed (by hand) refuse and ground dolomitic limestone at 1/3 cup per bushel, should be spread amongst the layers of refuse. Wood ashes at 1 cup per bushel of refuse may be substituted for the limestone. Coal ash *should not* be used.

Green manuring is also a useful practice to increase organic matter and often the nitrogen content of a mineral soil. The crops are turned under at an immature stage to supply easily decomposable organic material to the soil. Ryegrass, fall rye, barley and oats are some non-legume crops that could be used. Legumes such as alfalfa, clover, beans, peas and vetch (if inoculated thoroughly with a proper bacteria) fix considerable amounts of nitrogen in the soil. A combination of one pound of barley or oats with 1/2 pound of field peas (Trapper) spring seeded over an area of 400 sq. ft. provides a very good green manure crop when plowed under in the late summer.

Fertilizer Use

The application of a commercial fertilizer, liquid or granular form, is the quickest way of producing a response in plant growth. The essential elements required for plant growth are readily available in commercial fertilizers. These same elements in organic material have to be released by decomposition and re-formed into a usable state. Consequently, rotted manures and composts release nutrients slower and over a much longer period than most commercial fertilizers.

The fertilizer needs of horticultural crops should be based on soil analysis determined every three to four years. In the absence of a proper soil test the following general recommendations can be applied:

For perennial crops such as fruit trees, trees or shrubs, apply one to two cups of 13-16-10 per 100 sq ft under the branches (away from the trunk) very early in the spring. If an excessive amount of new growth occurred during the previous growing season reduce the application rates by one half. Apply only a small amount of rotted manure or compost early in the spring. Late applications tend to prevent trees from reaching adequate dormancy in the fall. Do not apply both manure and commercial fertilizer in any given year.

For currants, gooseberries and raspberries apply 13-16-10 at three cups per 50 foot of row, or preferably rotted manure and compost lightly worked into the soil between the rows at one to two cubic feet per 100 sq ft early in the spring. Avoid applying both manure and commercial fertilizer at full rates as the combined applications could injure plant roots.

For strawberries apply 13-16-10 at two cups per 50 foot of row after picking, as a wide band over the row or as a sideband placed in the soil four inches to the side of the plant. Only apply fertilizer over the row when the plants are dry and when water is available to wash off the plants. Manure or compost should be applied the year prior to planting but avoided on new or established plantings as it can result in severe weed infestation.

For vegetable crops which are irrigated, a general recommendation would be to broadcast a complete commercial fertilizer such as 13-16-10 or 8-20-20 at three to four cups per 100 sq ft (i.e., 600-800 lbs per acre).

The lower rate should be used on sandy soils or non-irrigated crop areas while the lower nitrogen fertilizer should be used where manure or compost has been applied. Salad, bulb and cole crops require additional nitrogen and a fertilizer such as 34-0-0 or preferably, 21-0-0 should be applied at 1/2 cup per 100 sq. ft as a side-dressing four to six weeks after transplanting. Internal darkening and rot in beets, broccoli, cauliflower and rutabagas may indicate a boron deficiency. The application of borax at one to two oz per 100 sq ft (trace amounts only) or a dilute boron solution, such as that used for washing clothes, would prevent further problems for one or two years.

Not all vegetable crops should receive manure or compost in the year they are planted as it greatly increases the incidence of scab in beets and potatoes and split roots in carrots. A good rotation accommodates these needs by having rotted manure or compost added to the soil areas growing salad, bulb and cole crops (including beans and peas) and no recent manure addition to the soil areas growing potatoes and root crops. Rotted manure or compost applied in the fall uniformly at one to two inches thick over the soil and incorporated would last one to two years.

Transplants

Vegetables and flowers grown from transplants rather than from direct seeding are better able to compete with weeds.

Any vegetable and flower requiring more growing days to reach maturity than that provided normally in any growing season should be started from transplants. The plant having "a head start" is able to reach maturity in the garden well before killing frosts arrive in the fall.

The transplant system is also used to grow produce earlier for early farm sales and home consumption. Thus, the same kinds of plants are grown as transplants and also direct seeded in the garden to provide successive harvesting over a longer period of time. Many seed catalogues indicate the days required to grow a plant from seeding to harvest in southern regions. However, experience has shown that in the north, warm season crops require about 20 days more than those listed, while cool season crops require about 10 days. There are exceptions, particularly if the garden site is well protected from wind or if special crop management procedures such as hot-tents, mulches or tunnels are used. Generally, cool season and slow growing vegetables such as late cabbage, head lettuce, onions and pumpkins requiring more than 80 days to reach maturity, should be grown only from transplants and not direct seeded. Warm season vegetables such as corn, peppers, tomatoes and some cucumbers (which have an extended harvest period) requiring more than 72-80 days to reach maturity should be grown from transplants or direct seeded only if special crop management procedures are used to speed up growth. Plants requiring less than 72 days from seeding to harvest such as beans, cauliflower, early cabbage, peas and some very early maturing corn and tomatoes can be direct seeded in the garden and expected to reach maturity within the Stikine growing season.

"Hardening off" or the adjustment of the succulent young seedling plants to the outdoor climate should be gradual over a period of 7-10 days. The process consists of reducing the number of waterings, but watering thoroughly each time, reducing the air temperature by increased circulation with outside air or moving the plants outdoors during the day and returning them under cover at night. Do not allow plants to wilt nor reduce air temperature by more than 5° at a time.

Approximately five to seven weeks after seeding, plants are ready for hardening off and transplanting out. Prior to planting out, water thoroughly and let drain. When transplanting, ensure that the roots are not exposed to the sun or drying winds. Plants grown in peat pots, jiffy pots, veneer bands or as plugs are superior to bare root plants for quick recovery and growth.

Several "starter" fertilizer solutions are available, such as 20-20-20 or 10-52-17. Dissolve 1/3 pound of either fertilizer into 10 gallons of warm water (1.5 Kg per 500 L) and apply 1/2 cup per plant if using 20-20-20 or one cup per plant if using 10-52-17. Cabbage, cauliflower and broccoli plants prefer 20-20-20 while tomatoes, peppers, melons and cucumbers prefer 10-52-17 as a starter solution. Continue to irrigate with warm water for maximum growth.

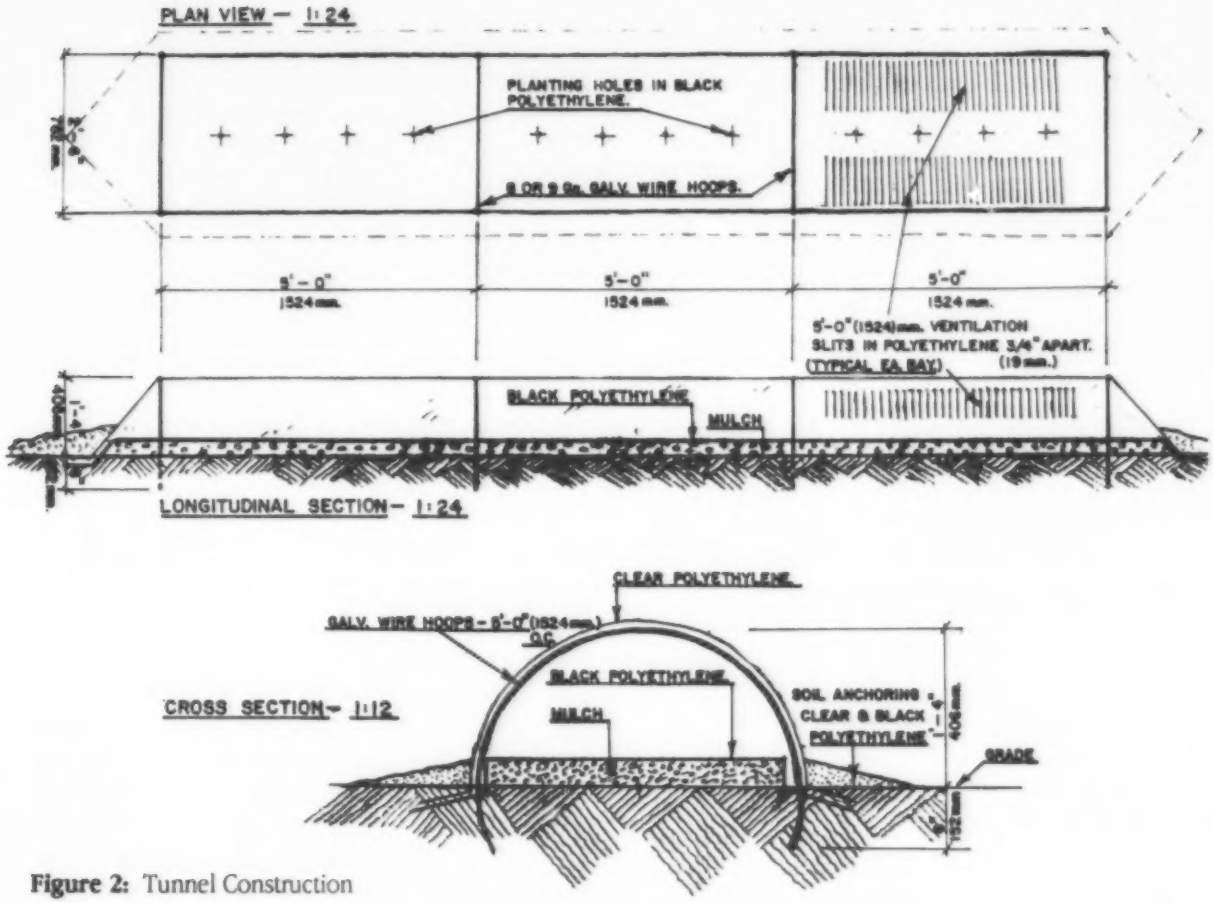

Figure 2: Tunnel Construction

Frost Protection

There are several recommended techniques to be used to protect tender horticultural crops against cold weather or frost and increase their growth and maturity. The following are worth considering:

Delay transplanting out until the normal frost-free period arrives and harden off all tender plants prior to setting out.

Sprinkler irrigate to protect plants from light frosts. The water must be applied prior to freezing and remains on until freezing has ceased. Ice-covered plants are not frozen and grow normally after the ice melts and warm conditions return. Cold sensitive plants such as cucumbers show chill symptoms – grey blotches on the leaves – but only recover if the plants are protected from further chilling.

Use hotbeds and coldframes to start young plants and harden off plants. Both are constructed similarly having a sloping removable roof and a southern exposure to collect the sun's rays. Hotbeds differ from coldframes, in that they have a source of heating and thus provide much more protection from frost. One method of hotbed construction is to use manure, preferably fresh horse manure, to provide heat through fermentation. The manure is either piled in a pit or on the ground, and the frame set on it.

If fresh manure is used, allow the temperature of the soil over the manure to drop to 80°F (27°C) before planting. The other method for heating a hotbed is to use an electrical heating cable running underneath the soil and a thermostat set in the soil to regulate the temperatures. Hotbeds and coldframes, in particular, often require additional covers such as sacks or tarps to retain their heat on cold nights. Both require venting to prevent over-heating on sunny days.

Use greenhouses for frost protection, especially if heated. However, for the bedding plant production of vegetables and flowers not only is it important to heat the greenhouse during cold periods, it is equally important to have the facilities to adequately ventilate and cool the greenhouse when temperatures get too high, or when plant growth has to be controlled to prevent development of leggy plants.

Adapt special crop-management procedures such as mulches, tunnels and hot-tents to modify the growing climate locally and extend the harvest period.

Mulches are laid over a moist smoothed solid surface to attract and collect the sun's rays and heat absorption and to prevent further moisture loss by evaporation. Use clear or black polyethylene (plastic) sheets 2 mils in thickness and in rolls three or four feet wide. Clear plastic warms the soil the best, however, a herbicide is usually required to control weed growth under the plastic. Black plastic provides excellent weed control. The mulches are held in place by having three inches of the edges well buried in a shallow trench overlaid with soil. Seeds or plants are set into the soil through slits made in the plastic at intervals. Holes made too close together should be avoided as wind may catch and tear the plastic mulch. Avoid planting out until all danger of frost is past as mulches alone provide no protection against frost. Paper, straw or sawdust mulches should not be used as these tend to insulate the soil against the sun's heat.

Mulches can be used to grow both cool and warm season vegetable crops with the possible exception of closely seeded beets, carrots and radishes. Strawberries, currants and gooseberries can also be grown through black plastic mulches (BPM).

Tunnels made of clear plastic 1.1 to 2 mils in thickness or spun-bonded polyester material (Reemay) placed over wire hoops are generally used along with plastic mulches (Figure 2). The solid plastic tunnels have to be opened on warm sunny days and closed at night or on dull days. The slitted plastic material consists of two rows of 5-inch long slits three-quarters of an inch apart along each side. The two rows of slits are about two feet apart (see sketch). The perforated plastic material consists of 1/2 inch round holes scattered over the whole surface of the plastic and represent about 7% of the whole area. The last two plastic materials are self-ventilating but provide only limited frost protection. The Reemay material is mesh-like, pervious to both air and water and provides up to 3° of frost protection. Consequently warm season plants are set out under

Figure 3: Raised beds can be used to improve heat absorption

plastic tunnels only after the real danger of frost is over while those under Reemay can generally be set out a week earlier. Tunnels can be used without BPM but excessive moisture loss and weed growth become a serious problem unless a herbicide or an irrigation system is used.

Setting up a tunnel consists of preparing the soil, putting the BPM in place, seeding or planting the plants through the BPM, placing and inserting galvanized hoops (cut from #8 or #9 wire) four to five feet apart over and through the edges of the BPM, stretching the tunnel material over the hoops, fastening the ends with stakes and burying the edges with soil to prevent wind damage. The tunnels are usually kept in place four to five weeks or when the plants reach the walls of the tunnel or when flowers appear and must be exposed for pollination purposes. The plants under the tunnels should be exposed gradually to the outside air by cutting the plastic at intervals lengthwise and opening the material over two or three days. Since Reemay is porous to air it can be carefully removed without cutting and stored in a dry dark place for use the next year.

Since most tunnels are only 18-24 inches tall, vegetables grown have been limited to low-growing plants. Other vegetable and flower crops, however, can be accommodated provided taller tunnels are prepared by using longer hoops and wider than usual 67-inch wide tunnel materials. Wide solid clear plastic sheets could be used if small perforations (less than two inches in diameter) are scattered along the plastic using a gas-fired soldering torch.

Hot-tents or the smaller hot-caps have been used successfully for many years in the north. Since these are made of thin paper-like material they provide several degrees of frost protection. Hot-tents are held in place by placing soil over the flap ends covering the ground. To prevent over-heating a slit is cut on the leeward side of the hot-tent and gradually opened wider as the weather warms. Since no BPM is covering the soil, weed growth and loss of moisture can be a problem when using hot-tents.

GREENHOUSE CROPS

In addition to growing bedding plants, greenhouses can be used to grow a short-term crop of beans, cucumbers, leaf lettuce, radishes and tomatoes for home consumption or limited farm sales (Figure 4). Winter growing would be difficult and costly in the Stikine as supplementary lighting would be required.

Figure 4: Kathy Syme informs the author of her greenhouse crops.

Fibreglass greenhouses are preferred to plastic-covered houses because of their ability to withstand the weight of heavy snowfalls.

To reduce heat loss and heating costs of fibreglass greenhouses, the following procedures could be used:

- the addition of a single sheet of clear plastic to the inside roof and walls to form a dead air space;
- the insulation of the non-plastic north wall, including any 3-foot pony side walls, made of wood around the greenhouse;
- the addition of wood-fuelled stoves as a source of heat to allow early spring planting and extend harvesting in the fall.

To reduce over-heating and disease problems related to poor ventilation and uneven watering, roof venting or forced-air ventilation is required, particularly in the late spring and during the summer. Growing in containers filled with new soil each year helps avoid soil-borne diseases. Damping off of seedlings, root rots and outbreaks of botrytis can be reduced by not overwatering or by the use of automatic watering systems which meters out given amounts of water and fertilizer on a regular basis. More information on greenhouse construction, disease and insect control is available from the Smithers B.C.M.A.F.F. office.

FLOWER SEED PROTECTION

In 1983 the B.C. Seed Evaluation Project evaluated seed production of a few wildflowers in an effort to find a high-value crop for the Stikine Valley (Richardson 1984). The results of the trial were as follows:

Species	Date Harvested	Seed Yield (kg/ha)
Tall Catch fly	Aug.15	72
Birds Eye	Aug.15	222
Chinese houses	Aug.15	90
Globe Gilia	Aug.15	86
Corn Poppy	Aug.15	14
Farewell-to-spring	Sept.21	29
California Poppy	Aug.15	29
Placelia	Aug.15	158

In addition, native wildflowers offer promise for seed harvests but testing is required to determine their performance in southern markets which have a shorter day length.

As with any seed production endeavor, markets should be secured prior to harvest. Some of the B.C. wholesale seed companies will purchase wildflower seed.

BERRY CROPS

Berry crops require silt loam to loam soils, good soil and air drainage. Spring planting is essential to allow plants to develop and reach dormancy before winter. After the ground becomes frozen many berry crops such as strawberries should be mulched with slough hay or coarse straw for winter protection making sure the mulch is removed in the spring prior to any appreciable growth. Mulching prior to freeze up encourages mice infestation and severe damage to plants. Mice control practices may have to be adopted.

It is important to follow the fertilizer schedule outlined on page 4.

MARKETING

Considerable savings to home owners can be made by growing fruits, berries and vegetables. However, excess produce can be sold from the farm gate or delivered to retail stores providing the quality is consistent. Prices received for such produce is somewhere between the wholesale and retail prices depending on the quality and the amount of competition in the market place.

STORAGE

Whether fruit or vegetables are grown for home consumption or for sale to the public, good storage is all important. Fruit and vegetables for storage should be well grown, free from insect injuries and diseases, and carefully harvested at maturity. Most vegetables such as cabbage and carrots, with the exception of potatoes, should be stored at just above freezing temperatures in a well ventilated, reasonably moist atmosphere with space to allow free circulation of air.

Pumpkins and squashes, however, require a temperature around 50°F (10°C) with a dry atmosphere. Potatoes require a little more humidity but with a temperature of 39°F (4°C).

TREES AND SHRUBS

Growing experience with fruit trees, ornamental trees and shrubs in the north is limited. The experiences of local horticultural experts and recommendations made by Dr. R. E. Harris (retired Research Scientist with Agriculture Canada, Beaverlodge), are important to help gardeners select trees and shrubs that may be suited to the area (see recommendations for trial plantings). Much trial work has yet to be conducted by the people living in the area.

Transplanting puts a drastic shock on plants, but shock can be minimized and losses reduced by adequate care prior to, during, and after transplanting. Container grown plants have less shock when transplanted than bare root plants. To plant, the container is removed and any roots that tend to circle the root ball should be spread out. Paper or peat pots can be planted with roots intact but must be set lower than the soil surface so they can rot and not dry out. Similarly, balled and burlapped trees or shrubs can be planted with burlap on the root ball provided the tie at the top is cut, the burlap opened and covered with soil.

When planting, the hole should be deeper and wider than the root mass to allow the tree to be planted 5 cm (2 inches) deeper than it grew in the nursery. Do not place fresh manure or granular fertilizer in the hole with the roots. Well-rotted manure or compost can be mixed with loose soil in the hole and with the topsoil filling the hole. This is particularly important on sandy or gravelly soils.

It is essential to firm the soil as the hole is filled and leave a depression around the plant to hold a pail of water. Failure to firm the soil, especially around the roots at the bottom of the hole is a frequent cause of tree loss after transplanting.

Watering to expel all air from around the roots is essential, particularly on sandy soils or during hot weather. Fill the depression around the plant several times with water after planting and once or twice a week afterward if required, but do not water it continuously as too wet a condition can be harmful to the roots.

Winter hardiness can be affected by management practices. Paper, straw and sawdust mulches are sometimes used to delay spring leaf and flower growth and to avoid damage by late spring frosts. For example, too early growth in strawberries, bulbs, perennial flowers, and fruit trees can be delayed in this manner. The mulch is removed to allow soil warming and growth to proceed.

A July application of potash (0-0-60) on semi-hardy ornamentals or trees will induce earlier dormancy in plants whereas fresh manure or nitrogenous fertilizers applied in July decreases winter hardiness. The nitrogen stimulates late plant growth which is killed by the winter frosts.

Many winter losses are also due to dehydration. All plant material, especially evergreens, should go into the winter well watered.

It is important to remember that plants brought in from the outside regions will survive in the north provided they have the genes for winter hardiness and they are spring planted to allow these characteristics to develop prior to the onset of winter.

Fruit Tree Growing

The growing of fruit trees is becoming more important to the home gardener. Recommended varieties are listed on page 15.

Planting Site and Preparation

Good surface drainage for air and water movement is important. Heavy soils, steep slopes or river bottoms that act as frost pockets should be avoided. A shelter of some kind should be developed.

Purchasing Fruit Trees

Most tree fruits are not self-pollinating. Two different varieties must be grown in close proximity and have an overlap in blooming period before adequate fruit set will occur. Insect pollinators, such as bees, must also be present in sufficient numbers to transport the pollen between varieties.

It is important to purchase thrifty, one year old trees for planting. There is no advantage to buying two or three year old trees as they frequently do not have the proper framework of branches and have to be cut back to 25 cm to stimulate growth of new branches.

Fruit trees grown from seed are called seedlings. Seedlings of named fruit trees varieties do not come true from seed and should be avoided as the results will almost always be disappointing. The purchase of grafted or budded trees of the desired variety is recommended. If possible, also know the kind of rootstock on which the variety of fruit has been grafted or budded. Purchasing fruit trees from a northern nursery gives better assurance that the rootstock used will survive the climate.

Planting Fruit Trees

Spring planting is preferred and should be done as soon as the ground is workable. If you received a fall shipment, do not despair, but rather open up the trees, mark with identification tags and heel-in immediately in a sheltered garden area. To heel-in, dig a trench about 40 cm deep (or sufficient size to accommodate the root system) with one slide sloping at 30 degrees. Place the trees in the trench with the trunks on the slope, water, pack and water again. Do not prune the plants.

When planting the fruit trees, always handle the tree by holding the plant below the graft union in order to reduce the chances of breakage at the point of union. Space the planting holes at least five to six metres apart in all directions. Make the planting holes of ample size to receive the entire root system without cramping or bending the roots. Place some topsoil in the hole, set the tree one or two inches deeper than it was in the nursery (note the dark colour) and place more topsoil shifting it in, around, and over the roots. Place a grafted tree in the planting hole so that the graft is at ground level. After planting, firm the soil and leave a depression around the tree to hold water. Water well and remove all wire identifying labels that could cause girdling of the tree at a later date. The tree is now ready for pruning.

Pruning Fruit Trees

After transplanting, cut the young tree off at 25 cm from the ground level. Also, remove or severely shorten any side shoots. This will be the most difficult, yet the most important task you will have to do for the fruit trees. It is very important to keep the trunk of the fruit tree no longer than 25 cm as experience has shown that taller trunks are subject to severe damage from sun scald. The short trunks are usually covered by snow, which protects them. If the snow cover is light, shading the south side of the trunk will help reduce sun scald.

During the growing season, branches are produced on the main stem. These should be thinned to four or five evenly spaced around the stem at different levels. It is essential to select branches that protrude out at a right angle from the stem. A branch with a right angel crotch is much stronger to support the fruit load, and in some areas, the snow load in the winter. A strong branch on the south side is ideal to provide shade and help prevent sun scald to the stem. Unwanted or broken branches are removed shortly after they start to grow. All selected branches are pruned to approximately one quarter of their length and allowed to branch. The next year the laterals are pruned lightly.

Any further pruning until fruiting starts should be discouraged as pruning delays fruiting. Broken, diseased or winter-killed branches should be removed. Never leave a stub, but rather saw the branch off even with the stem (or trunk).

After fruiting starts, prune annually in the spring while the tree is still dormant. Pruning when the buds have broken is not usually harmful and is preferred over no pruning at all. Do not fall prune even if the tree is dormant. Do not, under any circumstances, severely prune fruit trees, even overgrown trees. These can be brought into shape over a period of several years. Some general recommendations for pruning are:

1. Remove diseased or broken branches when noticed
2. Remove cross-over branches
3. Remove interfering or extra branches servicing the same area of the tree
4. Remove water sprouts or all branches (suckers) coming from below the graft
5. If the tree still appears too dense for proper colouring of the fruit, weak branches can be pruned out as they often produce poor size and colour of fruit.

Pruning wounds or bark damage over 2 cm across should be cleared of loose bark and painted with some type of tree dressing to keep out disease or rotting organisms.

RECOMMENDED VARIETIES

The highlighted varieties have been tried and are recommended. Other varieties are newer varieties that are available and could be grown on a trial basis.

VEGETABLES

NAME	VARIETIES
ASPARAGUS	**Viking, Mary Washington**
BEANS, GREEN	**Bush Blue Lake, Provider, Contender, Spring Green, Speculator, Improved Tendergreen, Top Crop, Strike**
BEANS, YELLOW	**Sungold,** Gold Crop
BEET	**Formanova, Ruby Queen, Stokes Special Early, Detroit Dark Red,** Red Ace
BROCCOLI	**Emperor, Premium Crop, Paragon, Goliath, Waltham 29,** Cruiser, Eureka, Italian Green Sprouting
BRUSSELS SPROUTS	**Lunet,** Oliver, Jade Cross
CABBAGE, GREEN (EARLY/MID)	**Emerald Acre, Early Marvel, Stonehead, Roundup,** Early Copenhagen, Grenadier, Polar Green, Castello, Charmant
CABBAGE, GREEN (LATE)	**Survivor, Houston Evergreen,** Penn State Ballhead, Bartolo, Safekeeper
CABBAGE, SAVOY	**Speedy Savoy**
CABBAGE, RED	**Meteor,** Ruby Ball, Red Acre, Hardoro, Pierrette
CARROT	**Coreless Amsterdam, Scarlet Nantes, Klondike Nantes, Chantenay Long, Touchon, A-Plus, Special Nantes 616,** Eagle, Six Pak II, Gold Pak 28C, Navajo, Fontana
CAULIFLOWER	**Extra Early Snowball, Andes, White Summer, Taipan,** White Rock
CORN	**Polar Vee, Earlivee, Northern Vee, Butter Vee,** Spartan, Earlivee II, Precocious
CUCUMBER (SLICER)	**Stokes Early Hybrid, Supersett, Dasher II,** Straight Eight, Marketmore, Slice Master
CUCUMBER (PICKLING)	**Double Yield, Pioneer Spear It,** Morden Early, Lucky Strike (Gyonecious – all female species), Calypso
KOHLRABI	**Early White Vienna,** Early Purple Vienna, Grand Duke
LEEK	**Giant Musselburg,** Kilima, Gailan, Alaska

LETTUCE (HEAD)	**Ithaca,** B Strain Great Lakes, Salinas, Target
LETTUCE (LEAF)	**Buttercrunch, Parris Island Cos, Black Seeded Simpson, Slo Bolt**, Red Sails, Waldmann's Dark Green, Genecorp Green
ONION (BUNCHING)	**Southport White Globe, Beltsville Bunching,** Ishikura, Tokyo Long White, White Lisbon
ONION (DRY BULB)	**Yellow Dutch, Norstar, Taurus, Columbia, Tarmagon, Capable, Cuprum, North Star, Blitz, Copra** (Replace sets with transplants)
PARSLEY	**Champion Moss Curled**, Forest Green, Dark Green Italian
PARSNIP	**Harris Model, Hollow Crown Improved,** White Spear
PEAS	**Sugar Snap, Little Sweetie, Green Arrow, Lincoln, Improved Laxton's Progress, Little Marvel, Olympia**, Progress #9
PEPPERS	**Bell Boy,** Canary (Green-Yellow)
POTATO (EARLY/MID)	**Warba, Norland, Norgold Russet, Yukon Gold**
POTATO (LATE)	**Kennebec, Nooksack, Russet Burbank, Bintje, Red Pontiac,** Russet Norkotah
PUMPKIN	**Small Sugar, Spirit, Autumn Gold**
RADISH	**Cherry Belle, Comet, Scarlet Globe, White Icicle,** Easter Egg
RUTABAGA	**Alta Sweet, Laurentian**
SPINACH	**America, Melody, Olympia, Cold Resistant Savoy (plant in August or Spring),** Tyee
SQUASH	**Zucchini Select, Gold Rush, Sundance,** Scallopini, **Peter Pan,** Black Jack
SWISS CHARD	**Rhubarb**, Fordhook Giant, Lucullus
TURNIP	**White Lady**, Purple Top White Globe
TOMATO	**Early Cascade, Early Summer Sunrise, Tiny Tim, Subarctic Maxi, Fantastic, Vendor, Dombito, Caruso, Beefsteak, Ultra Girl,** Sweet 100, Celebrity, Basket Vee
TOMATO (TO PLANT OUTDOORS)	**Cold Set, Starfire**
ZUCHINNI	Zucchini Select, Seneca Zucchini, Super Select, Spineless Beauty, Black Jack, Greyzini

SMALL FRUIT

STRAWBERRIES		**Ogalalla, Fort Laramae, Kent Glooscap,** Blomidon
RASPBERRIES	(Yellow)	Yellow Honey Queen
RASPBERRIES	(Red)	Chief, Boyne, Killarney, Red Rook, Matsqui
RASPBERRIES	(Black)	None recommended
RASPBERRIES	(Purple)	Royalty
CURRANTS	(Red)	Red Lake, Red Viking
CURRANTS	(White)	Imperial
CURRANTS	(Black)	Black Consort
BLUEBERRIES (1/2 HIGH)		North Blue, North Country

MISCELLANEOUS FRUIT

CRABAPPLES	**Rescue**, Dolgo, Trailman
DESSERT APPLES	**Norland**, Parkland, Westland, Yellow Transparent
HARDIER QUALITY APPLES	Norda, Noran
CHERRY (SOUR) (BUSH)	Mongolian
CHERRY (SWEET) (BUSH)	Nanking
PLUMS	Brook Red, Brook Gold
CHERRY/PLUMS	Sapa, Manor, Opata
SASKATOONS	Smoky, Northline, Thiessen, Honeywood, Pembina

RECOMMENDED TREES AND SHRUBS

LARGE TREES

Common Name	Botanical Name	Heights	Zone
Birch, Canoe (paper)	*Betula papyrifera*	30' - 40'	2
Cherry, Choke	*Prunus virginiana* 'Schubert'	9' - 20'	2
Pin	*pensylvanica*	10' - 20'	1
Larch, Eastern (Tamarack)	*Larix laricina*	45' - 60'	1
Siberian	*sibirica*	35' - 60'	2
Poplar, Balsam	*Populus balsamifera*	35' - 45'	1
	Hybrid cultivars	50' - 60'	1
Willow	*Salix*	20' - 40'	1b

SMALL FLOWERING TREES

Common Name	Botanical Name	Heights	Zone
Hawthorn	*Crataegus arnoldiana*	20' - 25'	2b
May Day Tree	*Prunus padus commutata*	8' - 30'	2
Mountain-ash, Showy	*Sorbus decora*	12' - 25'	2

NOTE: At Mile 1019, Alaska Highway, none are known. May Day Tree, above, and Mountain-ash (*Sorbus americana*) are showing promise but are not yet adequately tested.

LARGE EVERGREENS

Common Name	Botanical Name	Heights	Zone
Pine, Lodgepole	*Pinus contorta latifolia*	35' - 60'	1
Spruce, Norway	*Picea abies*	45' - 80'	2b
White	*Picea glauca*	45' - 65'	1

SMALL EVERGREENS

Common Name	Botanical Name	Heights	Zone
Arborvitae, American	*Thuja occidentalis*	medium	3
Juniper, Mountain	*Juniperus communis saxatilis*	low	2
Creeping	*horizontalis*	low	2
Pine, Mugho	*Pinus mugo mughus*	low	1

SHRUBS

Common Name	Botanical Name	Heights	Zone
Almond, Dwarf Russian	*Prunus tenella*	1 1/2' - 3'	2
Buffaloberry, Silver	*Shepherdia argentea*	12'	1
Caragana, Pygmy	*C. aurantiaca*	3' - 6'	2
Cinquefoil, Shrubby	*Potentilla fruticosa*	1' - 3'	1
Cotoneaster, Hedge	*C. lucida*	4' - 7'	1
Peking	*acutifolia*	3' - 8'	1
Dogwood, Red Osier	*Cornus stolonifera*	5' - 6'	1b
Elder, European Red	*Sambucus racemosa*	8'	3
Fireberry	*Crataegus chrysocarpa*	4' - 12'	2
Honeysuckle, Albert Thorn	*Lonicera spinosa albertii*	3'	2
Tatarian	*tatarica*	7'	2
Lilac, Preston	*Syringa x prestoniae* 'Coral'	7'	2
	'Royalty'	7'	2
Rose, Altai	*Rosa spinosissima altaica*	5'	2
Rugosa	'Hansa'	1' - 5'	2
	'Therese Bugnet'	1' - 5'	2
Saskatoon	*Amelanchier ainifolia*	4' - 8'	1
Spirea, Three-lobed	*Spiraea trilobata*	3'	2
Willow, Peach-leaved	*Salix amygdaloides*	6' - 8'	2

RECOMMENDED LANDSCAPING MATERIALS

HEDGES AND WINDBREAKS

(H = hedges; W = windbreaks; T = tall, 10'and up; M = medium, 5' - 9'; S = small, 1' - 4')

COMMON NAME	BOTANICAL NAME	HEIGHT AND USE	ZONE
Birch, Dwarf	*Betula* (the commonest is *B. blandulosa*)	M, H	2
Cotoneaster, Peking	*C. acutifolia*	S, M., H	2
Hawthorn, Cerro	*Crataegus cerronensis*	M, H	2
Honeysuckle, Tatarian	*Lonicera tatarica*	M, H	2
Larch, Siberian	*Larix sibirica*	T, W, H	2
Peashrub, Pygmy	*Caragana aurantiaca*	S, H	2
Siberian	*arborescens*	M, H	2
Pine, Lodgepole	*Pinus contorta latifolia*	T, W	1
Spruce White	*Picea glauca*	T, W	1

GROUND COVERS

COMMON NAME	BOTANICAL NAME	HEIGHT AND	ZONE
Buffaloberry	*Shepherdia*	12" - 14"	1
Juniper, Common	*Juniperus communis saxatilis*	12" - 24"	2
Creeping	*horizontalis*	12"	2

LAWN GRASSES

COMMON NAME	BOTANICAL NAME
Bluegrass, Kentucky	*Poa pratensis*
Fescue, Creeping Red	*Festuca rubra*

PERENNIALS

COMMON NAME	BOTANICAL NAME
Aster (hardy)	
Baby's Breath	*Gypsophila paniculata*
Bleeding Heart	*Dicentra spectabilis*
Columbine	*Aquilegia*
Delphinium	*D. elatum*
Gaillardia	
Harebell	*Campanula rotundifolia*
Iris (in interior)	*Iris* ' Kluanne Beauty'
Lily	*Lilium elegans* 'Lyla McCann'
Western Wood	*philadephicum andinum*
Lupine	*Lupinus argenteus*
Lythrum	*L. salicaria var. roseum superbum*
Maltese Cross	*Lychnis chalcedonca*
Monkshood	*Aconitum*
Peony	*Paenia*
Phlox	*P. paniculata*
Poppy, Iceland	*Papaver nudicaule*
Oriental	*orientale*
Rudbeckia, Brown-eyed Susan	*R. hirta*
Speedwell	*Veronica spicata*
Stonecrop, in variety	*Sedum*

ANNUALS

COMMON NAME	BOTANICAL NAME
Alyssum	*Lobularia maritima*
Baby's Breath	*Gypsophila elegans*
Cornflower	*Centaurea cyanus*
Dahlia (seed)	
Daisy, South African	*Dimorphotheca*
Swan River	*Brachycome* l *beridifolia*
Lobelia	*L. erinus*
Love-in-a-mist	*Nigella damascena*
Marigold, in variety	*Tagetes*
Mignonette	*Reseda odorata*
Nemesia	
Pansy	*Viola*
Petunia	
Phlox	*P. drummondii*
Poppy, California	*Eschscholzia californica*
Snapdragon	*Antirrhinum*
Stock	*Mathiola*
Sweet Pea	*Lathyrus odoratus*
Zinnia	

BULBS, CORMS AND TUBERS

(From Mile 1019 Alaska Highway -- all other aeas still experimental).

COMMON NAME	BOTANICAL NAME
Daffodil, King Alfred	*Narcissus*
Grape Hyacinth	*Muscari*
Scilla	
Tulip	*Tulipa*

— PLANT AND SEED SOURCES —

(Prices of catalogues as of January 1992)

AIMERS
81 TEMPERANCE ST
AURORA, ONTARIO
L4G 2R1 **FREE**

BECKER'S SEED POTATOES
RR 1,
TROUT CREEK, ONTARIO
P0H 2L0 **FREE**

BOUGHEN NURSERIES
BOX 12
VALLEY RIVER, MANITOBA
R0L 2B0 **FREE**

CAMPBERRY FARM
R.D. CAMPBELL
RR 1
NIAGARA-ON-THE LAKE
ONTARIO L0S 1J0 **$1.00**

C.A. CRUICKSHANK'S INC
1015 MOUNT PLEASANT RD
TORONTO, ONTARIO
M4P 2M1 **$3.00**

DOMINION SEED HOUSE
GEORGETOWN, ONTARIO
L7G 4A2
FREE

FERNCLIFF GARDENS
8394 MCTAGGART ST
SS 1
MISSION, B.C.
V2V 5V6
FREE

GARDENIMPORT INC
BOX 760
THORNHILL, ONTARIO
L3T 4A5 **$3.00/2 YRS**

GRIMO NUT NURSERY
RR 3
LAKESHORE ROAD
NIAGARA-ON-THE-LAKE
ONTARIO L0S 1J0
$1.00

ALBERTA NURSERIES & SEEDS LTD
BOX 20
BOWDEN, ALBERTA
T0M 0K0 **FREE**

BISHOP SEEDS LTD
BOX 338
BELLEVILLE, ONTARIO
K8N 5A5 **FREE**

BUMPER CROP GARDEN CENTRE
1316 CENTRE ST, NE
CALGARY, ALBERTA
T2E 2A7 **$2.00**

CORNHILL NURSERY
RR 5
PETITCODIAC, N.B.
E0A 2H0
$2.00

DACHA BARINKA
46232 STRACHCONA RD
CHILLIWACK, B.C.
V2P 3T2 **SASE**

EARLY'S FARM & GARDEN CENTRE
BOX 3024
SASKATOON, SASKATCHEWAN
S7K 3S9
$2.00

FISH LAKE GARLIC MAN
RR 2
DEMORESTVILLE, ONTARIO
K0K 1W0
$2.00 WITH SASE

GAZE SEED CO. (1987) LTD
9 BUCHANAN STREET
BOX 640
ST. JOHN'S, NFLD
A1C 5K8 **FREE**

HALIFAX SEED CO. INC.
BOX 8026, 5860 KANE ST
HALIFAX, N.S. B3K 5L8
$1.00

AUBIN NURSERIES LTD
BOX 1089
CARMAN, MANITOBA
R0G 0J0 **FREE**

BLUEBERRY HILL
RR1, BOX D
MAYNOOTH ONTARIO
K0L 2S0 **FREE**

THE BUTCHART GARDENS
BOX 4010, STN A
VICTORIA, B.C.
V8X 3X4 **$1.00**

COUNTRY LANE HERBS &
DRIED FLOWERS
RR 3
PUSLINCH, ONT
N0B 2J0 **SASE**

WILLIAM DAM SEEDS
BOX 8400
DUNDAS, ONTARIO
L9H 6N1 **$2.00**

ECOGENESIS SEEDS
16 JEDBURGH ROAD
TORONTO, ONTARIO
M5M 3J6
$2.00

FOLKLORE HERB CO LTD
2388 WEST 4TH AVE
VANCOUVER, B.C.
V6K 1P1
FREE

GOLDEN BOUGH TREE FARM
MARLBANK, ONTARIO
K0K 2L0
$1.00

HARMONY GARDENS
RR 3
MERRICKVILLE, ONTARIO
K0G 1N0 **FREE**

THE HERB FARM
RR #4,
NORTON, N.B.
E0G 2N0 **$3.00**

V. KRAUS NURSERIES
BOX 180
CARLISLE, ONTARIO
L0R 1H0 **FREE**

MCFAYDEN SEEDS
BOX 1800
BRANDON, MANITOBA
R7A 6N4 **$2.00**

MULLIGAN SEEDS
1600 APELDOORN AVE
OTTAWA, ONTARIO
K2C 1V5 **$1.50**

OSLACH NURSERIES INC
RR #1
SIMCOE, ONTARIO
N3Y 4J9 **FREE**

PICKERING NURSERIES INC
670 KINGSTON ROAD
PICKERING, ONTARIO
L1V 1A6 **$3.00**

RAINFOREST MUSHROOM
SPAWNBOX 1793
BOX 1793GIBSONS, B.C.
GIBSONS, B.C.
V0N 1V0 **$2.00**

SALT SPRING SEEDS
BOX 33
GANGES, B.C.
V0S 1E0 **$2.00**

SPROUT FARMS FRUIT TREE NURSERY
BOX 538
BON ACCORD, ALBERTA
T0A 0K0 **$2.00**

T & T SEEDS LTD
BOX 1710
WINNIPEG, MANITOBA
R3C 3P6 **$.100**

HERITAGE SEED PROGRAM
RR #3
UXBRIDGE, ONTARIO
L9P 1R3 MAGAZINE **$10/MEMB.**

LIVING PRAIRIE MUSEUM
2795 NESS AVE
WINNIPEG, MANITOBA
R3J 3S4 **$1.00**

MCMATH'S DAFFODILS
6340 FRANCIS ROAD
RICHMOND, B.C.
V7C 1K5 **$3.00**

NORTHERN KIWI NURSERY
RR 3, 181 NIVEN ROAD
NIAGARA-ON-THE-LAKE, ONT
L0S 1J0 **FREE**

CARL PALLEK & SON NURSERIES
BOX 137
VIRGIL, ONTARIO
L0S 1T0 **FREE**

PRAIRIE GROWN GARDEN SEEDS
BOX 118
COCHIN, SASKACHEWAN
S0M 0L0 **FREE WITH SASE**

RICHTERS
GOODWOOD, ONTARIO
L0C 1A0 **$2.50**

SHADES OF HARMONY LTD
BOX 598
KINGSTON, N.S.
B0P 1R0 **$2.00**

STIRLING PERRENIALS
RR #1
MORPETH, ONTARIO
N0P 1X0 **$2.00/3 YRS**

TERRITORIAL SEEDS
BOX 46225, STN. G
VANCOUVER, B.C.
V6R 4G5 **FREE**

HONEYWOOD LILIES
BOX 63
PARKSIDE, SASK
S0J 2A0 **$2.00**

MAPPLE FARM'S
RR #1
HILLSBOROUGH, NB
E0A 1X0 **SASE**

MORDEN NURSERIES
BOX 1270
MORDEN, MANITOBA
FREE

ONTARIO SEED CO LTD
BOX 144, 16 KING STR, S
WATERLOO, ONTARIO
N2J 3Z9 **FREE**

W.H. PERRON & CO LTD
2914 LABELLE BLVD
LAVAL, QUEBEC
H7P 5R9 **$3.00**

PRISM PERENNIALS
C-45, S-25, RR #1
CASTLEGAR, B.C.
V1N 3H7 **$2.00**

ROCKWOOD GARDENS LTD
501 HARRIS STREET
ROCKWOOD, ONTARIO
N0B 2K0 **FREE**

SIBERIA SEEDS
6218 QUINPOOL ROAD
HALIFAX, N.S.
E3L 1A3 **SASE**

STOKES SEEDS
CANADA
39 JAMES STREET
BOX 10
ST. CATHARINES, ONT.
L2R 6R6 **FREE**

WESTERN BIOLOGICALS LTD.
BOX 283
ALDERGROVE, B.C.
VOX 1A0 **$2.00**

WINDMILL POINT FARM & NURSERY
2103 BOULEVARD PERROT
NOTRE DAME ILE PERROT, QUE
J7V 5V6 **FREE**

WINDY RIDGE NURSERY INC
BOX 301
HYTHE, ALBERTA
T0H 2C0 **FREE**

WOODLAND NURSERY
2151 CAMILLA ROAD
MISSISSAUGA, ONTARIO
L5A 2K1 **$4.00**

WRIGHTMAN ALPINES
RR #3
KERWOOD, ONTARIO
NOM 2B0 **$2.00**

STANLEY ZUBROWSKI
BOX 26
PRAIRIE RIVER, SASK
S0E 1J0 **SASE**

— SEEDS FROM SOUTH OF THE BORDER —

THE COOK'S GARDEN
BOX 535, MOFFITS BRIDGE
LONDONDERRY, VERMONT
05148 **FREE**

COMPANION PLANTS
7247 N. COOLVILLE RIDGE
ATHENS, OHIO
45701 **$3.00 US**

THE COUNTRY GARDEN
BOX 3539
OAKLAND, CALIFORNIA
94609-0539 **$2.00 US**

SELECT SEEDS
180 STICKNEY HILL ROAD
UNION, CONNECTICUT
06076 **$2.00 US**

SHEPHERD'S GARDEN SEEDS
6116 HWY 9
FELTON, CALIFORNIA
95018 **$1.00 US**

THOMPSON & MORGAN, INC
BOX 1308
JACKSON, NEW JERSEY
08527 **FREE**

"SASE – SELF ADDRESSED STAMPED ENVELOPE

FIELD CROPS

Cereals

Early to medium maturing varieties of oats and barley and early maturing wheat varieities have produced good grain yields. Early varieties are preferred to overcome the wet September weather. The oat varieties listed below can also be grown for hay.

Cereals for grain should be planted at 80 to 100 kg/ha while oat cover crops should be planted at 50 to 70 kg/ha. Fertilizers containing N, P, and S are recommended but K may be added if soil test indicates a deficiency.

Recommended Varieties

Oats

Calibre - low percent hull, high test weight, equal maturity to Cascade.

Cascade - high grain yield but low protein levels.

Derby - good oat for horses, palatable, two days earlier than Cascade.

Jasper - four days earlier than Cascade, good drought resistance, higher protein than Cascade.

Barley

AC Stacey - early six-row rough awn barley for grain; resistant to scald; developed at Beaverlodge.

Brier - medium maturity; six-row smooth awn.

Spring Wheat

Cutler - very early maturing Prairie spring wheat; good resistance to lodging and shattering.

Katepwa - early maturing hard red spring wheat; resistant to loose smut and bunt; good lodging and shattering resistance.

Sources of Field Crop Seed and Materials

Bulkley Valley Farm Supply
Box 190
Telkwa, B.C.
V0J 2X0
Phone: (604) 846-5856

Smithers Feed Store
Box 252
Smithers, B.C.
V0J 2N0
Phone: (604) 847-9810

Forage Crops

The best forages for the Stikine Valley are alfalfa, red and alsike clover and the grasses - timothy, bromegrass, orchardgrass and reed canarygrass. Crested wheatgrass can be used on dry areas with alfalfa for pasture or hay.

Critical management of forage includes use of adapted species and varieties and the use of phosphate, potassium, sulfur and boron application according to soil test. Legume survival ensures the potential for production of high quality hay. Legume seed innoculation with the proper rhizobium is also essential for good yield.

Figure 5: Rick Bauer in his irrigated alfalfa field.

Recommended hay mixtures include:

Mixture	Seeding Rate kg/ha	Comments
Alfalfa	8	All areas except extremely
Bromegrass	5	wet or dry or where soil pH is ≥ 5.9
Alfalfa	6	Areas with pH ≥ 5.9
Bromegrass	4	and moderate moisture
Orchardgrass	4	levels or under irrigation.
Timothy	2	
Alfalfa	5	Semi-dry and very dry
Crested wheatghrass	5	areas.
Red clover	3	Areas where soil pH ≤ 5.8
Timothy	3	or excess moisture or high water
Bromegrass	4	table restricts the use of alfalfa.
Alsike clover	2	Areas with high water table
Reed canarygrass	8	or subject to flooding.
Timothy	2	

Pasture mixtures for horses or sheep would include:

Alfalfa or Red Clover	2
White Clover	1
Bromegrass	5
Timothy	3
Creeping red fescue	2

Recommended Species and Varieties

Legumes

Alfalfa - recommended for well-drained soils where the pH is 5.9 or higher; alfalfa use significantly improves feed quality; will winterkill where boron is deficient.

Anik - very hardy; developed at Mile 1019 but poor seed production has caused shortages; very fine leaves and stems.

Heinrichs - developed at Swift Current from selections of Rambler and Roamer; weak creeper; approximate yield of Peace with better bacterial wilt resistance.

Peace - developed at FL Vermilion from selections of Grimm for persistance under multiple cuttings and good protein content.

Rambler - creeping rooted variety developed at Swift Current; high yield in North Peace.

Rangelander - high yielding in Peace region; strong creeping root system; very hardy; very persistant under grazing.

Spredor 2 - strong creeping rooted variety but lower yielding than Rangelander in the Peace region.

Red Clover (single cut varieties only) - biennial or short-lived perennial; well adapted to acid soils; difficult to cure for hay.

Altaswede - highest yielding variety in the Peace region.

White Clover (low growing) - used in pasture mixture.

Grasses

Creeping Red Fescue - strong creeper, widely adapted from acid to calcareous and fertile to infertile soils; will out-perform Kentucky bluegrass and timothy on poor soils but can respond well to nitrogen and moisture.

Boreal - highest yielding variety; well adapted to pasture but will take over forage mixtures in three to four years.

Crested Wheatgrass - drought tolerant bunchgrass well adapted to drier areas or fields; early spring or late fall pasture; tetraploid varieties require 1 - 2 kg/ha more seed than diploid varieties.

Fairway - diploid type with short fine stems; useful in areas subject to heavy trampling.

Kirk - developed at Saskatoon from a Finnish introduction; tetraploid with erect growth.

Parkway - diploid tall growing type with good forage yields.

Meadow Bromegrass - early pasture grass with better regrowth than smooth bromegrass with adequate moisture; weak creeper compared to smooth bromegrass; lower yielding than smooth bromegrass.

Regar, Fleet or Paddock - registered varieties.

Orchardgrass - long-lived perennial bunchgrass under right conditions; will not tolerate extreme icing, bare snowcover, flooding or close grazing; prefers well drained, fertile soils.

Kay - developed in Ottawa from a USSR introduction adapted to cold wet spring conditions; best combination of winterhardiness and yield in northern areas.

Reed Canarygrass - tall, coarse perennial with moderate creeping habit; most tolerant grass of long term flooding (up to six weeks); rapid drop in feed quality after the boot stage; difficult to establish.

Palaton - developed in Iowa; more palatable than Rival and Vantage.

Rival - developed at the University of Manitoba for lower alkaloid levels and more seed production than Vantage.

Vantage - first low-alkaloid variety to be registered; appromimately ten percent higher yielding than other three varieties but not as low in alkaloid content.

Venture - developed in Iowa from selections for palatability and forage and seed yield; lowest gramine levels of these varieties.

Smooth Bromegrass - one of the best adapted grasses to northern conditons but not acid tolerant; strong creeper, limited regrowth.

Bravo - developed in Ontario from northern bromegrass types; yield equal to Manchar.

Carlton - highest yielding variety; hay type; well adapted to Peace region.

Manchar - good early growth, best adapted for pasture.

Rebound - not yet tested in B.C.; developed in South Dakota for regrowth vigour and improved digestibility over Carlton.

Signal - developed from Magna at Saskatoon for improved seed yields; yields similar to Manchar in the Peace; slightly lower digestibility levels than Carlton.

Timothy - hardiest bunchgrass, adapted to a wide range of soils where moisture is adequate; very productive with a wide range in maturity; poor regrowth under drought conditions; tolerant to acid soils.

Alma - developed in Finland; similar to Climax in maturity and forage yield with better seed yields.

Climax - standard high yielding hay type with med.-lat maturity.

Farol - developed in the Netherlands for resistance to drought tolerance; latest maturing variety available; hay type.

Glenmore - developed in Minnesota mostly from Climax with later maturity and resistance to stem rust; good yields.

Richmond - hay or pasture type; maturity between Toro and Climax; good yields.

Toro - early pasture type with good regrowth; developed in Italy.

MARKETING

There are no cattle in the vicinity of the Stikine so there is unlikely to be a market for grain except possibly for horses used for guiding and outfitting.

Horticulticulture produce has been marketed since 1980 at Wrangell by boat down the Stikine 256 kms. There are good local markets in Telegraph Creek and Dease Lake. Storage facilities have been set up in both communities. Produce is moved before winter from growers down river.

Until 1992, Cassiar was a potential market but after the mine closure, the town population has decreased.

If sufficient quantities were available Watson Lake could be a market to be developed.

There is a growing bedding plant industry at Glenora which cannot meet market needs.

Hay is in demand for guide outfitters who keep their horses up north for the winter. Good quality hay sells well at a price appropriate for the area. Most hay is Orchardgrass, Brome and Alfalfa. Straight Brome is popular; Alfalfa is considered too rich for overwintering horses.

SUMMARY

Work done under DATE #81 funding in 1981-1984 showed that on the estimated 2000-3000 hectares of class 1-4 land, a wide variety of crops can be grown.

Grain and horticultural crops of all types including tomatoes and corn, can be grown in a very amiable climate with approximately 120 frost free days.

Forage crops can produce two crops of excellent quality hay which can be utilized in the area.

The area was under-developed and unused since the 1920s, as the Pennsylvania Dutch who married into the Tahltan Indians, grew only potatoes and cabbage until 1974, when other settlers arrived from the United States and elsewhere.

Land around the Telegraph and Glenora area was surveyed only prior to 1978. In settling 23 units, the topography of the farmland determined the shape of the surveyed parcels.

Many settlers have come and gone in the last 20 years but about a dozen families have stayed and are producing hay and vegetables.

REFERENCES

Dobb, J.L., Tingle, J.N. and Riendeau, D., 1992. *Barley Variety Recommendations.* Forage Information Series factsheet 92-10, B.C. Ministry of Agriculture, Fisheries and Food.

Dobb, J.L., Tingle, J.N. and Riendeau, D., 1992. *Oat Variety Recommendations.* Forage Information Series factsheet 92-11, B.C. Ministry of Agriculture, Fisheries and Food.

Epp, P.F. and Fenger, M.A., 1978. *Soil and Agricultural Capability Inventory of the Telegraph Creek area.* B.C. Ministry of the Environment, Resource Analysis Branch, Kelowna. B.C.

Richardson, A.S., 1984. *Final Report B.C. Seed Crop Evaluation Project.* Sponsored by Agriculture Canada, New Crop Development Fund, British Columbia Ministry of Agriculture, Fisheries and Food, and Richardson Seed Company Ltd., Burnaby, B.C.

Tingle, J.N. and Forbes, J. 1991. *Peace River Forage Recommendations.* Forage Information Series factsheet 91-19. B.C. Ministry of Agriculture, Fisheries and Food.